

SAFETY PERFORMANCE DATA

RSPA's Office of Hazardous Materials Safety (OHM) maintains the Hazardous Materials Information System (HMIS). This system is the principal source of safety data related to hazardous materials transportation. It contains comprehensive information on hazardous materials incidents, exemptions and approvals, enforcement actions, and other elements that support the regulatory program.

The HMIS is used by DOT, other Federal agencies, state and local governments, industry, researchers, the media, and the public. HMIS data supports regulatory evaluation and policy making, training programs, the better understanding of hazardous materials transportation incidents, and identification of possible safety problems.

To enhance the HMIS, menu-driven programs used by state and local governmental agencies continued to be improved. These improvements permit generation of additional summary statistical reports, expand the search criteria, and give the ability to sort records before printing. Other system and database modifications improved HMIS information storage and retrieval capabilities. The six subsystems improved are:

- ▶ Incidents generally involving the transport of hazardous materials by one or more modes;
- ▶ Exemptions issued under the Hazardous Materials Regulations;
- ▶ Interpretations of regulations issued by RSPA;
- ▶ Approvals of specialized container manufacturers, reconditioners, retesters, shippers, and explosives manufacturers;
- ▶ Compliance activities, inspection data, and completed enforcement proceedings; and
- ▶ Registrants to the Hazardous Materials Registration Program.

In addition, RSPA used emerging technologies to improve the responsiveness of the HMIS. Alternative methods of archiving incident source documents are ongoing to improve the HMIS storage capability and the ease of retrieving reports. Also, additional software improvements for the HMIS data entry program were completed in 1998. Work continued on migrating the HMIS from its existing database management system into a more robust environment to improve system performance, maintenance, and accessibility. In 1998, RSPA began an initiative to make more data and reports available to the public on the Office of Hazardous Materials Safety Internet Home Page.

1998 Safety Statistics

In 1998, 15,205 hazardous materials incidents were reported. The total number of incidents increased by 1,225 this year. This is an increase of 8.8 percent. Most of this increase is due to higher levels of reporting by small-package highway carriers. Overall, highway incidents increased by 994 to 12,848. Rail incidents declined, dropping by 124 to 977, their lowest level in the past

decade. Although there were few non-bulk water incidents in 1995, their number more than doubled from five to 11. Reported air incidents increased by 349 (34 percent) to 1,369, reflecting continued efforts by both RSPA and FAA to improve carriers' awareness of the reporting criteria. Examining the incidents by hazard class, flammable-combustible liquids and corrosive materials were involved in the most incidents, accounting for 77 percent of all 1998 incidents.

On October 1, 1998, HM-200 went into effect, subjecting intrastate motor carriers who transport hazardous materials to the Federal hazardous materials regulations and incident reporting requirements. No significant effects have been noticed from this rulemaking in 1998, due to only three months of reporting.

Serious incidents, which RSPA has defined as an incident that involves a fatality or major injury due to a hazardous material, closure of a major transportation artery or facility or evacuation of six or more persons due to the presence of a hazardous material, or a vehicle accident or derailment resulting in the release of a hazardous material, remain constant with less than a two percent increase from 1997 to 1998. The 429 serious incidents equal 2.8 percent of all 1998 incidents. Further, in 1998, bulk incidents, while only 20.1 percent of all incidents, accounted for 75.3 percent of all serious incidents.

One incident in 1998 resulted in a significant number of injuries and/or fatalities. This incident, a highway shipment of gasoline being unloaded in Biloxi, MS, caused five fatalities and one major injury. Another incident, a truck accident in Chester, PA involving gasoline, caused two fatalities and more than \$4 million in damages. Two incidents involved the evacuation of a large number of people. In one of these incidents, a truck carrying Type E Blasting Explosives in Milwaukee, WI was involved in an accident and although there was no release of product, 900 people were evacuated. The other incident involved the release of formaldehyde solution, a corrosive material, from a derailment of two rail cars in Cox Landing, WV. In this incident, 500 people were evacuated. Additionally, there were three train derailments in 1998 that resulted in damages greater than \$2 million. While the number of rail incidents decreased in 1998, the damages due to rail incidents nearly doubled; however, these three derailments accounted for nearly half of all damages due to rail. These incidents maintained the urgency of DOT's continuous work to improve safety in transporting hazardous materials.

Description of Charts and Graphs

Exhibits 1.1 and 1.2 summarize hazardous materials transportation incidents over the past eight years. During this time, the number of incidents increased every year to a peak in 1994 and has declined through 1997. In 1998, however, there was an 8.8 percent increase in the number of incidents. Highway, clearly the most prevalent mode for incidents, accounted for the majority of incidents (85 percent) in that period and for all fatalities except in 1996 when an air incident and two rail incidents resulted in fatalities. Serious incidents have remained relatively steady throughout the 1990s, but declined eight percent in 1998 from a high reached in 1996.

Exhibit 1.3 summarizes vehicular accident and derailment incidents over the past eight years. The average number of incidents per year has been just under 300. All fatalities from these incidents were highway-related, except for two rail fatalities that occurred in 1996. All injuries involved highway and rail modes of transport.

Exhibit 1.4 summarizes hazardous waste incidents over the past eight years. The total number of hazardous waste incidents dropped each year from 1996 through 1998. The number of hazardous waste incidents in 1998 is more than 37 percent lower than the peak value, which occurred in 1995. After a long period with no fatalities, there was one fatality in 1996 and two more in 1998. All injuries involved highway and rail modes of transport.

Exhibits 2.1 and 2.2 display hazardous materials transportation incidents and fatalities over the past eight years and correspond to data from Exhibit 1.1.

Exhibits 2.3 - 2.6 display the number of incidents by mode over the past eight years. The number of incidents that are bulk and non-bulk is also shown for highway and rail. The number of bulk incidents has remained fairly steady since 1990, except for a noticeable reduction in bulk rail incidents in 1998.

Exhibit 3.1 displays the hazardous materials incidents reported since 1984 and regulatory changes affecting reporting requirements. The graph is segmented into highway and all other incidents, and shows the impact highway incidents have on the trend of incidents. The peak in incident reporting in 1994 is also particularly evident.

Exhibit 3.2 displays the serious hazardous materials incidents since 1990. Note that serious incidents are measured on a different scale than all incidents. Serious incidents have remained relatively steady throughout the 1990s, but have declined slightly from a peak in 1996.

Exhibit 3.3 illustrates the number of all incidents since 1990 that involved commodities shipped in bulk packagings. The number of bulk incidents has remained fairly constant during this period; most of the variability in the number of incident reports is due to changes in the number of non-bulk incidents.

Exhibits 4.1.1 and 4.1.3 show reported incidents and damages by hazard class. The first four columns of Exhibits 4.1.1 present and rank incidents by hazard class, and the last four columns present the number of incidents involving dollar damages, damages by dollar amount, percent, and rank. The majority of incidents and damages involved flammable-combustible liquids and corrosive materials. Exhibits 4.1.3 graphically depict the distribution of incidents among the top five hazard classes. Note that there is no Exhibit 4.1.2.

Exhibit 4.2.1 displays injuries by hazard class. Also included is a breakdown between major and minor injuries. In 1998, corrosive materials, flammable-combustible liquids, and poisonous materials accounted for more than 85 percent of injuries.

Exhibit 4.3 lists the hazardous materials involved in incidents resulting in fatalities. One air incident in 1996 involving oxidizers resulted in 110 fatalities. Of the remaining materials, gasoline accounted for the most fatalities in 1998.

Exhibit 4.4.1 ranks the 50 top hazardous materials involved in incidents. These 50 materials, out of approximately 3,000 hazardous materials identified in the Hazardous Materials Table, 49 CFR §172.101, are involved in 72.1 percent of all incidents in 1998. The Exhibit lists the commodity, corresponding hazard class, number of incidents reported for that commodity, and corresponding percentage.

Exhibit 4.5.1 ranks the hazardous materials involved in serious incidents. These materials are involved in three percent of all incidents in 1998. Gasoline accounts for more serious incidents than any other hazardous material. The Exhibit lists the commodity, corresponding hazard class, number of incidents reported for that commodity, and corresponding percentage.

Exhibit 5 shows the distribution of incident damages in the five categories that appear on the report form. Carrier damage and decontamination/cleanup costs made up 71.7 percent of the costs associated with incidents involving damages in 1998.

Exhibit 6.1 shows the breakdown of incident causes by mode of transportation. Human error was the main cause of incidents in 1998. Combined with package failure, these two causes are responsible for nearly 97 percent of all incidents. Note that for accidents and derailments the cause of the incident is not determined.

Exhibit 7.1 displays information on incidents involving an evacuation. The incidents are broken down by mode, cause, and consequence. Human error was the main cause of evacuation incidents in 1998. For rail, While human error is the leading cause of all rail incidents, it causes the fewest number of rail evacuations. When looking at total incidents with evacuations, accidents and derailments are nearly nine times as likely to cause evacuations than human error, package failure, and other incident causes combined.

Exhibit 8.1.1 shows the consequences of hazardous materials incidents by transportation phase. As can be expected, most incidents resulting in high damages were due to en route accidents. En route accidents also result in a higher average number of minor injuries per incident than the other incident types. Unloading incidents result in the second largest number of fatalities, the most major injuries, and by far the largest number of incidents.

Exhibit 8.2.1 displays the consequences of bulk and non-bulk hazardous materials incidents. Although an equal number of minor injuries result from bulk and non-bulk incidents, bulk incidents lead to significantly more fatalities, major injuries, and damages greater than \$50,000. Non-bulk incidents accounted for the majority of evacuations.

Exhibit 8.3.1 illustrates the consequences of hazardous materials incidents by time of day. Most injuries occur between 9 a.m. and noon. Fatalities are distributed throughout the late evening and early morning and the three hours after noon.

Exhibit 9.1 shows the number of serious bulk and non-bulk hazardous materials incidents by time of day. Most serious incidents occur between 6 a.m. and noon.

Exhibit 10.1 displays the breakdown of hazardous materials incidents, injuries, fatalities, and damages by state. States with large population centers and industrial cities had the most hazardous materials incidents.

Exhibits 11.1.1 - 11.7.1 display 1998 incident data by county. The areas with the greatest concentration of hazardous materials incidents either were industrial centers or included numerous terminal facilities. Exhibit 11.1.1 displays the location of all incidents reported to RSPA. Exhibit 11.2.1 shows the origin of shipments that resulted in an incident. Exhibit 11.3.1 shows the location of highway incidents and Exhibit 11.4.1 displays the location of rail incidents. Exhibit 11.5.1 shows the location of loading and unloading incidents and Exhibit 11.6.1 shows the location of incidents that occurred en route. Exhibit 11.7.1 shows the location of serious incidents. Note that the exhibits for rail, en route, and serious incidents use a different classification scheme from the other exhibits.